No. 8800084

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Western Plant Breeders, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT TY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS Y THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BARLEY

'WestBred Waxbar'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D. C. *this* 30th *day of* August *in the year of our Lord one thousand nine hundred and* ninety-one.

Attest:

Kenneth A. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Ed Madigan
Secretary of Agriculture

APPROVAL EXPIRES 2-28-88

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION	3. VARIETY NAME
Western Plant Breeders, Inc.	BFC-79-7	WestBred Waxbar

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*	5. PHONE *(Include area code)*	FOR OFFICIAL USE ONLY PVPO NUMBER
8111 Timberline Drive Bozeman, Montana 59715	(406) 587-1218	8800084

6. GENUS AND SPECIES NAME	7. FAMILY NAME *(Botanical)*
Hordeum vulgare	Graminea

FILING
DATE: Feb. 12, 1988
TIME: 1:30 ☐ A.M. ☑ P.M.

8. KIND NAME	9. DATE OF DETERMINATION
Barley	Sept. 1982

FEES RECEIVED
AMOUNT FOR FILING: $ 1800.00
DATE: Feb. 12, 1988
AMOUNT FOR CERTIFICATE: $ 200.00
DATE: July 16, 1991

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION	12. DATE OF INCORPORATION
Maryland	9/27/1985

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Dale R. Clark and Craig R. Cook
8111 Timberline Drive
Bozeman, Montana 59715
PHONE *(Include area code)*: (406) 587-1218

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED
- a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
- b. ☒ Exhibit B, Novelty Statement.
- c. ☒ Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
- d. ☐ Exhibit D, Additional Description of Variety.
- e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* ☒ Yes *(If "Yes," answer items 16 and 17 below)* ☐ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?	17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ Yes ☒ No	☐ Foundation ☐ Registered ☐ Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ Yes *(If "Yes," give date)*
☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ Yes *(If "Yes," give names of countries and dates)*
☒ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT	DATE
Dale R. Clark	Feb. 4, 1988
SIGNATURE OF APPLICANT	DATE
Craig R. Cook	Feb 4 1988

FORM LS-470 (3-86) *Edition of 7-84 obsolete.*

14a.

WestBred Waxbar (exp# BFC-79-7) was selected by Western Plant Breeders from their nursery located near Conrad, Montana in August of 1978. WestBred Waxbar was selected as a single F_2 plant from the F_2 bulk population resulting from crosses between WPB's male sterile population for selection of 2-rowed barleys and the variety Washonupana. An F_3 plot was grown near Conrad, Montana in the summer of 1979. Six plant selections were harvested from the F_3 plot in September and planted near Phoenix, Arizona in the fall of 1979. Uniform plots were harvested in bulk and the bulk F_5 seed was given the exp# BFC-79-7. The resulting F_5 bulk and successive F_6 to F_8 bulks were yield tested in irrigated and dryland areas of Montana, Idaho, and Washington in 1980 to 1983. 256 heads were harvested from the F_6 bulk and planted as single rows near Conrad, Montana in 1982. Seed from selected, uniform rows were harvested in September of 1982 and bulked. This F_7 bulk and successive F_8 to F_{10} bulks were yield tested in 1984 to 1987. The F_7 head-rowed bulk was also planted near Bozeman, Montana in the spring of 1985 to produce Breeders seed. The Breeders seed was used to plant 12 acres near Bozeman, Montana in the spring of 1986. This field was harvested as Foundation seed in September of 1986 and designated "WestBred Waxbar".

WestBred Waxbar was designed to be used in a "Waxy Barley" processing plant. As such a processing plant has not yet been built, Certified seed of WestBred Waxbar has not yet been released to the grower. The first date of anticipated release of Certified seed is the spring of 1989.

WestBred Waxbar is a stable and uniform variety in agronomic appearance and performance across several generations and growing conditions. Agronomic data to support this stability are presented in Tables I to Vb.

WestBred Waxbar

14b.

WestBred Waxbar is a hulless, waxy, short-awned, 2-rowed spring barley that is mid-late in maturity. The plant growth type of WestBred Waxbar is most similar to the variety Washonupana. WestBred Waxbar flowers 3 - 9 days later than Washonupana and is 5 to 13 cm taller than Washonupana. The spikes of WestBred Waxbar have a glossy appearance due to the lack of a wax coating (not to be confused with the "waxy" endosperm character) whereas Washonupana is not glossy in appearance. The above comparisons along with the complete objective description (14c.) show WestBred Waxbar to be a novel variety of spring barley.

14e.

Western Plant Breeders, Inc. is the employer of the breeders and rightfully, therefore, the owner of "WestBred Waxbar".

TABLE I: Yield in pounds per acre of WestBred Waxbar and presently grown varieties in Western Plant Breeders Trials.

LOCATION		YEAR	WESTBRED WAXBAR	WASHONUPANA	HECTOR	CLARK	PIROLINE
Conrad,MT.	(D)	1981	3867	3287	4292	-0-	-0-
	(I)	1982	4125	4067	4648	-0-	-0-
	(D)	"	3815	3292	4648	-0-	-0-
	(D)	1986	3564	3240	4212	3564	3942
Denton,MT.	(D)	1985	1968	-0-	2088	1877	2035
	(D)	1986	2262	1740	2668	2378	2320
Bozeman,MT.	(D)	1983	4582	3770	5510	-0-	-0-
	(D)	1984	3828	-0-	5452	5972	4872
	(D)	1985	4002	-0-	6032	6206	5800
	(I)	1986	4466	3712	4756	5278	4756
Steptoe,WA.	(D)	1985	4234	-0-	4872	4060	4698
	(D)	1986	3016	2842	3712	3712	3596

TABLE II: Plant height in inches of WestBred Waxbar and presently grown varieties in Western Plant Breeders Trials.

LOCATION	YEAR	WESTBRED WAXBAR	WASHONUPANA	HECTOR	CLARK	PIROLINE	STEPTOE
Conrad,MT. (D)	1986	28	24	29	27	28	24
Denton,MT. (D)	1985	20	-0-	23	18	20	18
(D)	1986	20	18	20	20	20	20
Bozeman,MT. (D)	1984	36	-0-	36	38	36	34
(D)	1985	35	-0-	35	30	33	35
(I)	1986	36	31	37	36	35	30
Steptoe,WA. (D)	1985	37	-0-	40	39	36	36
(D)	1986	31	27	31	29	29	30

TABLE III: Heading date of WestBred Waxbar and presently grown varieties in Western Plant Breeders Trials.

LOCATION		YEAR	WESTBRED WAXBAR	WASHONUPANA	HECTOR	CLARK	PIROLINE
Conrad,MT.	(D)	1982	7/17	7/11	7/13	-0-	-0-
	(I)	"	7/10	7/8	7/8	-0-	-0-
Bozeman,MT.	(D)	1983	7/10	7/4	7/5	-0-	-0-
	(D)	1984	7/18	-0-	7/12	7/13	7/12
	(D)	1985	7/11	-0-	7/7	7/7	7/5
	(I)	1986	7/13	7/4	7/7	7/8	7/4

D= Dryland

I= Irrigated

TABLE IV: Test Weight in pounds per bushel of WestBred Waxbar and presently grown varieties in Western Plant Breeders Trials.

LOCATION		YEAR	WESTBRED WAXBAR	WASHONUPANA	HECTOR	CLARK	PIROLINE
Conrad,MT.	(D)	1982	59	59	55	-0-	-0-
	(I)	"	57	56	53	-0-	-0-
	(D)	1986	61	58	56	56	56
Denton,MT.	(D)	1986	62	61	55	55	55
Bozeman,MT.	(D)	1983	56	50	55	-0-	-0-
	(D)	1984	56	-0-	53	55	54
	(I)	1986	54	49	51	48	49

TABLE Va: Agronomic dryland data of WestBred Waxbar and commercially grown varieties in Montana State Univ. trials -1982, Bozeman, MT.

	YIELD lbs/ac.	T.W. lBS/BU	HEADING DATA	PLT. HT. (inches)
WestBred Waxbar	3300	56.5	7/13	29
Hector	3746	53.8	7/11	29
Klages	3952	54.0	7/13	32
Unitan	4023	50.4	7/5	32
Compana	3514	51.0	7/8	28
Clark	3300	54.0	7/11	28

TABLE Vb: Agronomic dryland data of WestBred Waxbar and commercially grown varieties in Montana State University Trial (1987).

Location	WestBred WaxBar		Hector		Harrington	
	Yield (bu/ac)	T.W. (lbs/bu)	Yield (bu/ac)	T.W. (lbs/bu)	Yield (bu/ac)	T.W. (lbs/bu)
Huntley	55.4	51.2	61.9	51.7	66.8	48.3
Moccasin	54.9	49.1	62.4	53.4	76.1	51.2
Conrad	81.6	53.6	105.7	52.8	102.2	51.2
Havre	45.1	56.6	67.8	52.2	44.7	50.3
Sidney	60.4	52.0	67.6	52.5	65.5	51.5

8800084

WestBred Waxbar

FORM APPROVED. OMB NO. 40-R3712

FORM GR-470-5
(11-1-72)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C
(Barley)

OBJECTIVE DESCRIPTION OF VARIETY
BARLEY *(HORDEUM VULGARE)*

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
WESTERN PLANT BREEDERS, INC.

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*
8111 Timberline Drive
Bozeman, Mt. 59715

FOR OFFICIAL USE ONLY
PVPO NUMBER 8800084
VARIETY NAME OR TEMPORARY DESIGNATION WestBred Waxbar

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (i.e. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. GROWTH HABIT:

[1] 1 = SPRING 2 = FACULTATIVE WINTER 3 = WINTER [3] Early Growth: 1 = PROSTRATE 2 = SEMIPROSTRATE 3 = ERECT

2. MATURITY (50% Flowering):

[2] 1 = EARLY (California Mariout) 2 = MIDSEASON (Betzes) 3 = LATE (Frontier)

[0] No. of days *Earlier* than ..... [X]
[7] No. of days *Later* than ..... [5]
1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON 5 = PIROLINE 6 = PRIMUS 7 = UNITAN X = None

3, PLANT HEIGHT (From soil level to top of head):

[3] 1 = SEMIDWARF 2 = SHORT (California Mariout) 3 = MEDIUM TALL (Betzes) 4 = TALL (Conquest)

[0][8] Cm. *Shorter* than ..... [7]
[0][6] Cm. *Taller* than ..... [8]
1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON 5 = PIROLINE 6 = PRIMUS 7 = UNITAN 8= Steptoe

4. STEM:

[1] Exertion *(Flag to spike at maturity):* 1 = 0 - 3 cm. 2 = 3 - 10 cm. 3 = 10 - 15 cm.
[2] Anthocyanin: 1 = ABSENT 2 = PRESENT

[0][6] NO. OF NODES (Originating from node above ground)

[1] Collar Shape: 1 = CLOSED 2 = V-SHAPED 3 = OPEN 4 = MODIFIED CLOSED OR OPEN
[1] Shape of Neck: 1 = STRAIGHT 2 = SNAKY 3 = OTHER (Specify) _____

5. LEAF:

[1] Basal leaf sheath *(seedling):* 1 = GLABROUS 2 = PUBESCENT
[1] Position of flag leaf *(at boot stage):* 1 = DROOPING 2 = UPRIGHT

[2] Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY
[1][7] MM. WIDTH (First leaf below flag leaf)

[2][8] CM. LENGTH (First leaf below flag leaf)
[2] Anthocyanin in leaf sheath: 1 = ABSENT 2 = PRESENT

6. HEAD:

[1] Type: 1 = TWO-ROWED 2 = SIX-ROWED
[2] Density: 1 = LAX 2 = ERECT (Not dense) 3 = ERECT (Dense)

[2] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) _____
[1] Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY

[1] Lateral Kernels Overlap: 1 = NONE 2 = AT TIP 3 = 1/4 - 1/2 OF HEAD
[3] Rachis *(Hair on edge):* 1 = LACKING 2 = FEW 3 = COVERED

7. GLUME:

[3] Length: 1 = 1/3 OF LEMMA 2 = 1/2 OF LEMMA 3 = MORE THAN 1/2 OF LEMMA
[3] Hairs: 1 = NONE 2 = SHORT 3 = LONG

[3] Hair covering: 1 = NONE 2 = RESTRICTED TO MIDDLE 3 = CONFINED TO BAND 4 = COMPLETELY COVERED

[1] Awns: 1 = LESS THAN EQUAL TO LENGTH OF GLUMES 2 = EQUAL TO LENGTH OF GLUMES 3 = MORE THAN EQUAL TO LENGTH OF GLUMES

[3] Awn Surface: 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

//

WestBred Waxbar 8800084

FORM GR-470-5 (Reverse)

8. LEMMA:

[4] Awn: 1 = AWNLESS 2 = AWNLETS ON CENTRAL ROWS, AWNLESS ON LATERAL ROWS 3 = SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 = SHORT (less than equal to length of spike) 5 = LONG (longer than spike) 6 = HOODED

[3] Awn Surface: 0 = AWNLESS 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

[2] Teeth: 1 = ABSENT 2 = FEW 3 = NUMEROUS

[1] Hair: 1 = ABSENT 2 = PRESENT

[2] Shape of base: 1 = DEPRESSION 2 = SLIGHT CREASE 3 = TRANSVERSE CREASE

[2] Rachilla Hairs: 1 = SHORT 2 = LONG

9. STIGMA:

[2] Hairs: 1 = FEW 2 = MANY

10. SEED:

[1] Type: 1 = NAKED 2 = COVERED

[1] Hairs on Ventral Furrow: 1 = ABSENT 2 = PRESENT

[4] Length: 1 = SHORT (8.0 mm.) 2 = SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 = MIDLONG (8.5 - 9.5 mm.) 4 = MIDLONG TO LONG (9.0 - 10.5 mm.) 5 = LONG (10.0 mm.)

[1] Wrinkling of hull: 1 = NAKED 2 = SLIGHTLY WRINKLED 3 = SEMIWRINKLED 4 = WRINKLED

[1] Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE

[0][1] PERCENT ABORTIVE

[4][8] GMS. PER 1000 SEEDS

11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SEPTORIA	[1] NET BLOTCH	[0] SPOT BLOTCH	[0] POWDERY MILDEW
[1] LOOSE SMUT	[0] BACTERIAL BLIGHT	[0] COVERED SMUT	[1] FALSE LOOSE SMUT
[0] STEM RUST	[0] LEAF RUST	[0] SCAB	[1] SCALD
[0] AY	[0] BSMV	[1] BYDV	[0] OTHER (Specify)

12. INSECT: (0 = Not tested, 1 = Susceptible 2 = Resistant)

[0] GREEN BUG	[0] ENGLISH GRAIN APHID	[0] CHINCH BUG	[0] ARMYWORM
[0] GRASS HOPPERS	[0] CERIAL LEAF BETTLE	[0] OTHER (Specify) _____	

HESSIAN FLY RACES: [0] GP [0] A [0] B [0] C [0] D [0] E [0] F [0] G

13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] DDT [0] OTHER (Specify) _____

14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Washonupana	Seed size	Washonupana
Leaf size	Washonupana	Coleoptile elongation	Washonupana
Leaf color	Washonupana	Seedling pigmentation	Washonupana
Leaf carriage	Washonupana		Washonupana

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions and terms used in this form:

1. Wiebe, G. A., and D. A. Reid, 1961, Classification of Barley Varieties Grown in the United States and Canada in 1958, Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
2. Reid, D. A., and G. A. Wiebe, 1968, Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Pests, Agriculture Handbook No. 338, U.S. Dept. of Agriculture. pp. 61 - 84.
3. Malting Barley Improvement Association, Milwaukee, Wisconsin, 1971, Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.